



# UNIVERSITY OF BIRMINGHAM SCHOOL OF PHYSICS AND ASTRONOMY UNDERGRADUATE MODULES 2021

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## Our Courses

### Single Honours

- Physics BSc F300
- Physics (International Study) BSc F301
- Physics MSc F302
- Physics (International Study) MSc F303
- Physics and Astrophysics BSc FF35
- Physics and Astrophysics (International Study) BSc FF3M
- Physics and Astrophysics MSc FFH5
- Physics with Particle Physics and Cosmology BSc F372
- Physics with Particle Physics and Cosmology MSc F373
- Theoretical Physics BSc F342
- Theoretical Physics MSc F343

### Joint Honours

- Theoretical Physics and Applied Mathematics BSc FG31
- Theoretical Physics and Applied Mathematics MSc F3DG



## Why Study Physics at Birmingham?

Studying Physics at Birmingham means you will have the space to shape and mould your course to suit your interests. You will join a large, research-intensive school so your optional modules will cover many areas of Physics, and you can be confident the syllabus is updated to reflect advances in Physics as they happen. Transferable skills are embedded from the very start of the course, meaning you will graduate ready to succeed in a wide range of careers.

There are lots of Physics courses to choose from and flexibility is at the heart of them. It may be possible to:

- Change between the Single Honours courses in your application year or after Year 1
- Swap to and from the MSci at the end of Year 2
- Swap to the year abroad options at the start of Year 2
- Take an Intercalated Year in Computer Science in Year 3

## Credits

Each year is composed of 120 of credits, in the majority of cases this is 60 credits in each semester.

## Personal Tutorials

Personal tutorials happen weekly in the first and second years in groups of no more than four students. Your tutor will also help provide any guidance you need to plan your optional modules.

## Disclaimer

This booklet outlines the modules available to undergraduate students in the School of Physics and Astronomy for 2021. Please note this was written several months in advance of the start of the academic year. It is intended to provide prospective students with a general picture of the programmes and courses offered by the School.

Please note that not all programmes or all courses are offered every year. Also, because our research is constantly exploring new areas and directions of study some courses may be discontinued and new ones offered in their place. Finally, please note that prerequisites and timetabling restrictions can mean all options won't be open to you.



## Year 1 Semester 1

Physics BSc and MSci

0 optional credits.

### Compulsory Modules

- Classical Mechanics and Relativity A, 10 Credits
- Mathematics for Physicists 1A, 10 Credits
- Physics and Communication Skills 1, 10 Credits
- Physics Laboratory 1A, 10 Credits
- Probability and Statistics, 10 Credits
- Quantum Mechanics 1, Optics and Waves, 10 Credits

Physics and Astrophysics BSc and MSci

0 optional credits.

### Compulsory Modules

- Classical Mechanics and Relativity A, 10 Credits
- Mathematics for Physicists 1A, 10 Credits
- Physics and Communication Skills 1, 10 Credits
- Physics Laboratory 1A, 10 Credits
- Probability and Statistics, 10 Credits
- Quantum Mechanics 1, Optics and Waves, 10 Credits

Physics with Particle Physics and Cosmology BSc and MSci

0 optional credits.

### Compulsory Modules

- Classical Mechanics and Relativity A, 10 Credits
- Mathematics for Physicists 1A, 10 Credits
- Physics and Communication Skills 1, 10 Credits
- Physics Laboratory 1A, 10 Credits
- Probability and Statistics, 10 Credits
- Quantum Mechanics 1, Optics and Waves, 10 Credits

Theoretical Physics (with Labs) BSc and MSci

0 optional credits.

### Compulsory Modules

- Classical Mechanics and Relativity A, 10 Credits
- Mathematics for Physicists 1A, 10 Credits
- Physics and Communication Skills 1, 10 Credits
- Physics Laboratory 1A, 10 Credits
- Probability and Statistics, 10 Credits
- Quantum Mechanics 1, Optics and Waves, 10 Credits



Theoretical Physics (no Labs) BSc and MSci  
0 optional credits.

Compulsory Modules

- Classical Mechanics and Relativity A, 10 Credits
- Mathematics for Physicists 1A, 10 Credits
- Physics and Communication Skills 1, 10 Credits
- Probability and Statistics, 10 Credits
- Quantum Mechanics 1, Optics and Waves, 10 Credits
- Special Relativity and Dynamical Systems, 10 Credits

Theoretical Physics and Mathematics BSc and MSci  
0 optional credits.

Compulsory Modules

- Quantum Mechanics 1, Optics and Waves, 10 Credits
- Communication Skills and Data Analysis, 10 Credits
- Special Relativity, Probability and Random Processes, 10 Credits

Compulsory Modules taught outside the School of Physics and Astronomy

- Real Analysis and Calculus, 20 Credits
- Sequences and Series, 10 Credits



## Year 1 Semester 2

### Physics BSc and MSci

10 optional credits

#### Compulsory Modules

- Classical Mechanics and Relativity B, 10 Credits
- Electromagnetism 1, Temperature and Matter, 20 Credits
- Mathematics for Physicists 1B, 10 Credits
- Physics Laboratory 1B, 10 Credits

#### Optional Modules

- Chaos and Non-Linear Systems, 10 Credits
- Introduction to Astrophysics, 10 Credits
- Introduction to Particle Physics and Cosmology, 10 Credits

### Physics and Astrophysics BSc and MSci

0 optional credits.

#### Compulsory Modules

- Classical Mechanics and Relativity B, 10 Credits
- Electromagnetism 1, Temperature and Matter, 20 Credits
- Mathematics for Physicists 1B, 10 Credits
- Physics Laboratory 1B, 10 Credits
- Introduction to Astrophysics, 10 Credits

### Physics with Particle Physics and Cosmology BSc and MSci

0 optional credits.

#### Compulsory Modules

- Classical Mechanics and Relativity B, 10 Credits
- Electromagnetism 1, Temperature and Matter, 20 Credits
- Mathematics for Physicists 1B, 10 Credits
- Physics Laboratory 1B, 10 Credits
- Introduction to Particle Physics and Cosmology, 10 Credits

### Theoretical Physics (with Labs) BSc and MSci

0 optional credits.

#### Compulsory Modules

- Classical Mechanics and Relativity B, 10 Credits
- Electromagnetism 1, Temperature and Matter, 20 Credits
- Mathematics for Physicists 1B, 10 Credits
- Physics Laboratory 1B, 10 Credits
- Chaos and Non-Linear Systems, 10 Credits



## Theoretical Physics (no Labs) BSc and MSci 10 optional credits.

### Compulsory Modules

- Classical Mechanics and Relativity B, 10 Credits
- Electromagnetism 1, Temperature and Matter, 20 Credits
- Mathematics for Physicists 1B, 10 Credits
- Chaos in Discrete and Continuous Systems, 10 Credits

### Optional Modules

- Introduction to Astrophysics, 10 Credits
- Introduction to Particle Physics and Cosmology, 10 Credits

## Theoretical Physics and Mathematics BSc and MSci 0 optional credits.

### Compulsory Modules

- Electromagnetism 1, Temperature and Matter, 20 Credits
- Chaos and Non-Linear Systems, 10 Credits

### Compulsory Modules taught outside the School of Physics and Astronomy

- Mechanics, 10 Credits
- Vectors, Geometry and Linear Algebra, 20 Credits



## Year 2 Semester 1

### Physics BSc and MSci

0 or 10 optional credits, to make 120 across the year.

#### Compulsory Modules

- Mathematics for Physicists 2A, 10 Credits
- Optics, 10 Credits
- Particles and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Physics Laboratory 2, 10 Credits
- Quantum Mechanics 2, 10 Credits

#### Optional Modules

- Observational Astronomy, 10 Credits

### Physics and Astrophysics BSc and MSci

0 optional credits.

#### Compulsory Modules

- Mathematics for Physicists 2A, 10 Credits
- Optics, 10 Credits
- Particle and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Physics Laboratory 2, 10 Credits
- Quantum Mechanics 2, 10 Credits
- Observational Astronomy, 10 Credits

### Physics with Particle Physics and Cosmology BSc and MSci

0 or 10 optional credits, to make 120 across the year.

#### Compulsory Modules

- Mathematics for Physicists 2A, 10 Credits
- Optics, 10 Credits
- Particles and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Physics Laboratory 2, 10 Credits
- Quantum Mechanics 2, 10 Credits

#### Optional Modules

- Observational Astronomy, 10 Credits



## Theoretical Physics (with Labs) BSc and MSci

0 or 10 optional credits, to make 120 across the year.

### Compulsory Modules

- Mathematics for Physicists 2A, 10 Credits
- Optics, 10 Credits
- Particles and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Physics Laboratory 2, 10 Credits
- Quantum Mechanics 2, 10 Credits

### Optional Modules

- Observational Astronomy, 10 Credits

## Theoretical Physics (no Labs) BSc and MSci

0 or 10 optional credits, to make 120 across the year.

### Compulsory Modules

- Mathematics for Physicists 2A, 10 Credits
- Optics, 10 Credits
- Particles and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Quantum Mechanics 2, 10 Credits

### Optional Modules

- Observational Astronomy, 10 Credits

## Theoretical Physics and Mathematics BSc and MSci

0 optional credits.

### Compulsory Modules

- Particles and Nuclei and A Quantum Approach to Solids, 10 Credits
- Physics and Communications Skills 2, 10 Credits
- Quantum Mechanics 2, 10 Credits

### Compulsory Modules taught outside the School of Physics and Astronomy

- Linear Algebra, 10 Credits
- Multivariate and Vector Analysis, 20 Credits





## Year 2 Semester 2

### Physics BSc and MSci

10 or 20 optional credits, to make 120 across the year.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Mathematics for Physicists 2B, 10 Credits
- Physics Project, 10 Credits
- Statistical Physics and Entropy, 10 Credits

#### Optional Modules

- Eigenphysics, 10 Credits
- Electronics, 10 Credits
- Lagrangian and Hamiltonian Mechanics, 10 Credits
- Nuclear Physics and Neutrinos, 10 Credits
- Structure in the Universe, 10 Credits

### Physics & Astrophysics BSc and MSci

0 optional credits.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Mathematics for Physicists 2B, 10 Credits
- Astro Project, 10 Credits
- Statistical Physics and Entropy, 10 Credits
- Structure in the Universe, 10 Credits

### Physics with Particle Physics and Cosmology BSc and MSci

0 or 10 optional credits, to make 120 across the year.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Mathematics for Physicists 2B, 10 Credits
- Physics Project, 10 Credits
- Statistical Physics and Entropy, 10 Credits
- Nuclear Physics and Neutrinos, 10 Credits

#### Optional Modules

- Eigenphysics, 10 Credits
- Electronics, 10 Credits
- Lagrangian and Hamiltonian Mechanics, 10 Credits
- Structure in the Universe, 10 Credits



Theoretical Physics (with Labs) BSc and MSci  
0 or 10 optional credits, to make 120 across the year.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Mathematics for Physicists 2B, 10 Credits
- Statistical Physics and Entropy, 10 Credits
- Eigenphysics, 10 Credits
- Lagrangian and Hamiltonian Mechanics, 10 Credits

#### Optional Modules

- Electronics, 10 Credits
- Nuclear Physics and Neutrinos, 10 Credits
- Structure in the Universe, 10 Credits

Theoretical Physics (no Labs) BSc and MSci  
10 or 20 optional credits, to make 120 across the year.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Mathematics for Physicists 2B, 10 Credits
- Statistical Physics and Entropy, 10 Credits
- Eigenphysics, 10 Credits
- Lagrangian and Hamiltonian Mechanics, 10 Credits

#### Optional Modules

- Electronics, 10 Credits
- Nuclear Physics and Neutrinos, 10 Credits
- Structure in the Universe, 10 Credits

Theoretical Physics and Mathematics BSc and MSci  
0 optional credits.

#### Compulsory Modules

- Electromagnetism 2, 10 Credits
- Statistical Physics and Entropy, 10 Credits
- Eigenphysics, 10 Credits
- Lagrangian and Hamiltonian Mechanics, 10 Credits

Compulsory Modules taught outside the School of Physics and Astronomy

- Differential Equations, 20 Credits



## Year 3 Semester 1

### Physics BSc and MSci

30 optional credits.

#### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits
- Physics Laboratory 3A, 10 Credits

Optional Modules but at least 10 of these credits must be taken

- Physics Laboratory 3B, 10 Credits
- Scientific Computing 1, 10 Credits
- Scientific Computing 2, 10 Credits

#### Optional Modules

- Fission and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Observational Cosmology, 10 Credits
- Physical Principles of Radar, 10 Credits
- Semiconductor Optoelectronics, 10 Credits
- The Life and Death of Stars, 10 Credits

Optional Module taught outside the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits

### Physics and Astrophysics BSc and MSci

20 optional credits.

#### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits
- Observatory Laboratory, 20 Credits

Optional but at least 20 of these credits must be taken across the year

- Observational Cosmology, 10 Credits
- The Life and Death of Stars, 10 Credits

#### Optional Modules

- Fission and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Physical Principles of Radar, 10 Credits
- Semiconductor Optoelectronic, 10 Credits

Optional Module taught outside the School of Physics and Astronomy

- Complex Variable Theory, 10 credits



## Physics with Particle Physics and Cosmology BSc and MSci 20 optional credits.

### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits
- Observational Cosmology, 10 Credits
- Physics Laboratory 3A, 10 Credits

### Optional but at least 10 of these credits must be taken

- Physics Laboratory 3B, 10 Credits
- Scientific Computing 1, 10 Credits
- Scientific Computing 2, 10 Credits

### Optional Modules

- Fission and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Physical Principles of Radar, 10 Credits
- Semiconductor Optoelectronics, 10 Credits
- The Life and Death of Stars, 10 Credits

### Optional Module taught outside the School of Physics and Astronomy

- Complex Variable Theory, 10 credits

## Theoretical Physics BSc and MSci 20 optional credits.

### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits
- Scientific Computing 2, 10 Credits

### Compulsory Modules taught outside the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits

### Optional Modules

- Fission and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Observational Cosmology, 10 Credits
- Physical Principles of Radar, 10 Credits
- Scientific Computing 1, 10 Credits
- Semiconductor Optoelectronics, 10 Credits
- The Life and Death of Stars, 10 Credits

### Optional Modules taught outside the School of Physics and Astronomy

- Continuum Mechanics, 20 Credits
- Methods in Partial Differential Equations, 10 or 20 Credits



## Theoretical Physics and Mathematics BSc

Flexible number of optional credits, to make 120 across the year.

### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits

### Compulsory Modules taught outside of the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits
- Methods in Partial Differential Equations, 10 or 20 Credits

### Optional but at least 20 of these credits must be taken across the year

- Scientific Computing 2, 10 Credits

### Optional Modules

- Fissions and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Observational Cosmology, 10 Credits
- Physical Principles of Radar, 10 Credits
- Scientific Computing 1, 10 Credits
- Semiconductor Optoelectronics, 10 Credits
- The Life and Death of Stars, 10 Credits

### Optional but are taught outside of the School of Physics and Astronomy

- Advanced Mathematical Modelling, 20 Credits
- Continuum Mechanics, 20 Credits
- Mathematical Finance, 20 Credits



## Theoretical Physics and Applied Mathematics MSci 20 optional credits.

### Compulsory Modules

- Quantum Mechanics 3, 10 Credits
- Statistical Physics, 10 Credits

### Compulsory Modules taught outside of the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits
- Continuum Mechanics, 20 Credits

### Optional Modules

- Fission and Fusion, 10 Credits
- Medical Imaging, 10 Credits
- Observational Cosmology, 10 Credits
- Physical Principles of Radar, 10 Credits
- Scientific Computing 1, 10 Credits
- Scientific Computing 2, 10 Credits
- Semiconductor Optoelectronics, 10 Credits
- The Life and Death of Stars, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Advanced Mathematical Modelling, 20 Credits
- Mathematical Finance, 20 Credits
- Methods in Partial Differential Equations, 10 or 20 Credits



## Year 3 Semester 2

### Physics BSc and MSci

30 optional credits.

#### Compulsory Modules

- General Physics, 10 Credits
- Group Studies, 20 Credits

#### Optional Modules

- Asteroseismology and Exoplanets, 10 Credits
- Atomic Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Critique, 10 Credits
- Physics Teaching in Schools, 10 Credits
- Radiation and Relativity, 10 Credits

### Physics and Astronomy BSc and MSci

20 optional credits.

#### Compulsory Modules

- General Physics, 10 Credits
- Group Studies, 20 Credits
- Atomic Physics, 10 Credits

Optional module but at least 20 of these credits must be taken across the year

- Evolution of Cosmic Structure, 10 Credits

#### Optional Modules

- Asteroseismology and Exoplanets, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Critique, 10 Credits
- Physics Teaching in Schools, 10 Credits
- Radiation and Relativity, 10 Credits



## Physics with Particle Physics and Cosmology BSc and MSci 20 optional credits.

### Compulsory Modules

- General Physics, 10 Credits
- Group Studies, 20 Credits
- Particle Physics, 10 Credits

### Optional Modules

- Asteroseismology and Exoplanets, 10 Credits
- Atomic Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and communication, 10 Credits
- Nuclear Physics, 10 Credits
- Physics Critique, 10 Credits
- Physics Teaching in Schools, 10 Credits
- Radiation and Relativity, 10 Credits

## Theoretical Physics BSc

30 optional credits.

### Compulsory Modules

- General Physics, 10 Credits
- Current Topics in Theoretical Physics, 10 Credits
- Radiation and Relativity, 10 Credits

### Optional Modules

- Group Studies, 20 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Atomic Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Teaching in Schools, 10 Credits

### Optional Module taught outside the School of Physics & Astronomy

- Applied Mathematical Analysis, 20 Credits





## Theoretical Physics MSci

20 optional credits.

### Compulsory Modules

- General Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Current Topics in Theoretical Physics, 10 Credits
- Radiation and Relativity, 10 Credits

### Optional Modules

- Group Studies, 20 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Atomic Physics, 10 Credits, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Teaching in Schools, 10 Credits

### Optional Module taught outside the School of Physics & Astronomy

- Applied Mathematical Analysis, 20 Credits

## Theoretical Physics and Applied Mathematics BSc

Flexible number of optional credits, to make 120 across the year.

### Optional Module but at least 20 of these credits must be taken across the year

- Current Topics in Theoretical Physics, 10 Credits

### Optional Module taught outside of the School of Physics and Astronomy but at least 20 of these credits must be taken across the year

- Research Skills in Mathematics, 20 Credits

### Optional Modules

- General Physics, 10 Credits
- Group Studies, 20 Credits
- Asteroseismology and Exoplanets. 10 Credits
- Atomic Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits,
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Teaching in Schools, 10 Credits
- Radiation and Relativity, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Applied Mathematical Analysis, 20 Credits
- Numerical Methods and Numerical Linear Algebra, 20 Credits



## Theoretical Physics and Applied Mathematics MSci 40 optional credits.

### Compulsory Module

- Radiation and Relativity, 10 Credits

### Optional Modules

- General Physics, 10 Credits
- Group Studies, 20 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Atomic Physics, 10 Credits
- Chaos and Dynamical Systems, 10 Credits
- Condensed Matter Physics, 10 Credits
- Current Topics in Theoretical Physics, 10 Credits
- Evolution of Cosmic Structures, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Particle Physics, 10 Credits
- Physics Teaching in School, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Applied Mathematical Analysis, 20 Credits
- Numerical Methods and Numerical Linear Algebra, 20 Credits



## Year 4 Semester 1

### Physics MSci

40 optional credits.

#### Compulsory Module

- Research Project, 20 Credits

#### Optional Modules

- Current Topics in Particle Physics, 10 Credits
- Experimental Particle Physics Techniques, 10 Credits
- Fission and Fusion, 10 Credits
- Inference from Scientific Data, 10 Credits
- Nanophotonics, 10 Credits
- Observational Cosmology, 10 Credits
- Phase Transitions, 10 Credits
- Quantum Mechanics 4, 10 Credits
- Superconductivity, 10 Credits
- The General Theory of Relativity, 10 Credits
- Ultracold Atoms and Quantum Gases, 10 Credits

#### Optional Modules taught outside of the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits

### Physics and Astrophysics MSci

40 optional credits.

#### Compulsory Module

- Research Project, 20 Credits

#### Optional Modules

- Current Topics in Particle Physics, 10 Credits
- Experimental Particle Physics Techniques, 10 Credits
- Fission and Fusion, 10 Credits
- Inference from Scientific Data, 10 Credits
- Nanophotonics, 10 Credits
- Observational Cosmology, 10 Credits
- Phase Transitions, 10 Credits
- Quantum Mechanics 4, 10 Credits
- Superconductivity, 10 Credits
- The General Theory of Relativity, 10 Credits
- Ultracold Atoms and Quantum Gases, 10 Credits

#### Optional Modules taught outside of the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits



## Physics with Particle Physics and Cosmology MSci 20 optional credits.

### Compulsory Modules

- Research Project, 20 Credits
- Current Topics in Particle Physics, 10 Credits
- Experimental Particle Physics Techniques, 10 Credits

### Optional Modules

- Fission and Fusion, 10 Credits
- Inference from Scientific Data, 10 Credits
- Nanophotonics, 10 Credits
- Observational Cosmology, 10 Credits
- Phase Transitions, 10 Credits
- Quantum Mechanics 4, 10 Credits
- Superconductivity, 10 Credits
- The General Theory of Relativity, 10 Credits
- Ultracold Atoms and Quantum Gases, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Complex Variable Theory, 10 Credits

## Theoretical Physics MSci

20 optional credits.

### Compulsory Modules

- Research Project, 10 Credits
- Phase Transitions, 10 Credits
- Quantum Mechanics 4, 10 Credits
- The General Theory of Relativity, 10 Credits

### Optional Modules

- Current Topics in Particle Physics, 10 Credits
- Experimental Particle Physics Techniques, 10 Credits
- Fission and Fusion, 10 Credits
- Inference from Scientific Data, 10 Credits
- Nanophotonics, 10 Credits
- Observational Cosmology, 10 Credits
- Superconductivity, 10 Credits
- Ultracold Atoms and Quantum Gases, 10 Credits

### Optional Module taught outside of the School of Physics and Astronomy

- Topics in Applied Mathematics, 20 Credits



## Theoretical Physics and Mathematics MSci

Flexible number of optional credits, to make 120 across the year.

Optional Modules, but at least 10 of these credits must be taken

- Research Project, 10 Credits
- Research Project in Applied Mathematics, 20 credits

### Optional Modules

- Current Topics in Particle Physics, 10 Credits
- Experimental Particle Physics Techniques, 10 Credits
- Fission and Fusion, 10 Credits
- Inference from Scientific Data, 10 Credits
- Nanophotonics, 10 Credits
- Observational Cosmology, 10 Credits
- Phase Transitions, 10 Credits
- Quantum Mechanics 4, 10 Credits
- Superconductivity, 10 Credits
- The General Theory of Relativity, 10 Credits
- Ultracold Atoms and Quantum Gases, 10 Credits

Optional Modules taught outside of the School of Physics and Astronomy

- Advanced Mathematical Modelling, 20 Credits
- Graph Theory, 20 Credits
- Mathematical Finance, 20 Credits
- Topics in Applied Mathematics, 20 Credits

*Theoretical Physics and Applied Mathematics students may arrange to take other modules in the School of Mathematics subject to consultation with the course coordinator.*



## Year 4 Semester 2

### Physics MSci

30 optional credits.

#### Compulsory Module

- Research Project, 30 Credits

#### Optional Modules

- Advanced Condensed Matter Physics, 10 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Many Particle and Quantum Field Theory, 10 Credits
- Nuclear Physics, 10 Credits
- Physics Critique, 10 Credits
- Quantum Optics, 10 Credits
- Relativistic Astrophysics, 10 Credits

#### Optional Modules taught outside of the School of Physics and Astronomy

- Dynamics and Modelling of Weather and Climate, 20 Credits

### Physics and Astrophysics MSci

30 optional credits

#### Compulsory Modules

- Research Project, 30 Credits

#### Optional Modules

- Advanced Condensed Matter Physics, 10 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Many Particle and Quantum Field Theory, 10 Credits
- Nuclear Physics, 10 Credits
- Physics Critique, 10 Credits
- Quantum Optics, 10 Credits
- Relativistic Astrophysics, 10 Credits

#### Optional Modules taught outside of the School of Physics and Astronomy

- Dynamics and Modelling of Weather and Climate, 20 Credits



## Physics with Particle Physics and Cosmology MSci 30 optional credits.

### Compulsory Module

- Research Project, 30 Credits

### Optional Modules

- Advanced Condensed Matter Physics, 10 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Many Particle and Quantum Field Theory, 10 Credits
- Nuclear Physics, 10 Credits
- Physics Critique, 10 Credits
- Quantum Optics, 10 Credits
- Relativistic Astrophysics, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Dynamics and Modelling of Weather and Climate, 20 Credits

## Theoretical Physics MSci

20 optional credits

### Compulsory Module

- Research Project, 30 Credits
- Many Particle and Quantum Field Theory, 10 Credits

### Optional Modules

- Advanced Condensed Matter Physics, 10 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Nuclear Physics, 10 Credits
- Quantum Optics, 10 Credits
- Relativistic Astrophysics, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Dynamics and Modelling of Weather and Climate, 20 Credits
- Nonlinear Waves, 20 Credits



## Theoretical Physics and Mathematics MSci

Flexible number of optional credits, to make 120 across the year.

Optional Modules but at least 20 of these credits must be taken

Must continue project started in semester 1.

- Research Project, 30 Credits
- Research Project in Applied Mathematics, 20 Credits

### Optional Modules

- Advanced Condensed Matter Physics, 10 Credits
- Asteroseismology and Exoplanets, 10 Credits
- Condensed Matter Physics, 10 Credits
- Evolution of Cosmic Structure, 10 Credits
- Images and Communication, 10 Credits
- Many Particle and Quantum Field Theory, 10 Credits
- Nuclear Physics, 10 Credits
- Quantum Optics, 10 Credits
- Relativistic Astrophysics, 10 Credits

### Optional Modules taught outside of the School of Physics and Astronomy

- Advanced Mathematical Biology, 20 Credits
- Advanced Mathematical Finance, 20 Credits
- Dynamics and Modelling of Weather and Climate, 20 Credits
- Group Theory, 20 Credits
- Nonlinear Waves, 20 Credits

*Theoretical Physics and Applied Mathematics students may arrange to take other modules in the School of Mathematics subject to consultation with the course coordinator.*

*This leaflet was produced in advance of the start of the academic year. It is intended to provide prospective students with a general picture of the programmes and courses offered by the School. Please note that not all programmes or all courses are offered every year. Also, because our research is constantly exploring new areas and directions of study some courses may be discontinued and new ones offered in their place. Before you apply, please visit our website to view essential information for all applicants: [www.birmingham.ac.uk/applicantinformation](http://www.birmingham.ac.uk/applicantinformation).*

*Please note the information in this brochure is correct at time of publication but may be subject to change (July 2020).*